tance which must exist between the level of the grate and the hearth of the furnace, if this last operates with natural or chimney draft, or the draft pressure which is necessary if the air is forced in by a blower. After this, the required height of the chimney may be computed.

It is not desired, in this work, to present the complete computations for the design of all of the many different types of furnaces. The following, however, gives an example of the application of these methods of computation, as they have been used by the author.

Problem.—The design required is that of a small furnace for the reheating of small pieces of iron (billets or fagots) to be installed in connection with a waste heat boiler. The height between the hearth and the arch of the furnace cannot be less than 0 m 41; the width of the heating chamber is to be 2 m. The temperature of the gases at the outlet port is to be 1200°.

Computing the volume of the gases,

$$\frac{Q^2}{} \qquad \frac{120Q}{}$$

from which $1200 = 2 m^3 77 per second,

$$K'QQ = 0 m^3 514 per second$$

One kilogram of coal burned with an air supply 60 per cent in excess of the theoretical requirements produces

$$9.04+(8.72X0.60) = 14 m^3 27 of gases.$$

From this the quantity of coal required per second may be deduced

$$x : 1 = 0.514 : 14.27, \qquad x = 0 kg 036,$$

which will be 129 kg per hour or 3 tonnes 110 for twenty-four hours.

Fixing the dimensions of the furnace:

(a) *Height at Bridge Wall.*—This height will be determined as an inverted weir with the hot gas temperature £ = 1400°.

$$Quoo = 0.514(1+\frac{-}{V}—_T) = 0.514X6.12 = 3 m^3 15 per second,$$

$$-*/o/$$

$$= 0m423.$$